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Growth and yield characteristics of foxtail millet, proso millet and sorghum affected by paddy-upland rotation systems

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Abstract

This study is performed to investigate the optimal cropping systems to allow cultivation of upland crops to the paddy rice land. This experiment was conducted at Anseong-si Gyeonggi province of Korea in 2015. In order to investigate growth and yield characteristics of foxtail millet, proso millet and sorghum by different paddy-upland rotation systems, three crops foxtail millet, proso millet and sorghum with four varieties of Samdachal, Samdamae, Kyeongkwan1, Hwanggeumjo in foxtail millet, Leebaekchal, Manhongchal, Hwangsilchal, Hwanggeumgijang in proso millet and Nampungchal, Moktaksusu, Aneunbangisusu, Hwanggeumchal in sorghum were examined. Four paddy-upland rotation systems of paddy-upland rotation, paddy-upland-upland rotation, paddy-upland-upland-upland rotation, and upland-paddy-upland rotation system were tested. Days from seeding to heading and ripening of foxtail millet was the shortest in the paddy-upland-upland-upland rotation system, but proso millet and sorghum did not show statistical difference among four rotation systems. In the average of culm length, paddy-upland-upland-upland rotation system showed the highest culm length in foxtail millet (141.5cm), proso millet (159.6cm) and sorghum (138.6cm) respectively among four paddy-upland rotation systems. In average yield per 10a, foxtail millet and proso millet showed the highest each 234.3kg/10a, 176.2kg/10a in paddy-upland-upland-upland rotation system, whereas sorghum was the highest 221.2kg/10a in paddy-upland-upland rotation system. The most suitable crop and varieties in paddy-upland rotation system was judged to be sorghum among three crops and suitable varieties were Samdachal in foxtail millet, Leebaekchal in proso millet and Nampungchal in sorghum respectively.

Keywords: crop characteristics, foxtail millet, proso millet, sorghum, paddy-upland rotation

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